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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/925,850	08/09/2001	Sining Mao	12175-003001/ STL9812.00	3814

7590 09/11/2003
EDWARD P. HELLER, III ESQ
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EXAMINER

OMETZ, DAVID LOUIS

ART UNIT	PAPER NUMBER
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2653

DATE MAILED: 09/11/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/925,850

Applicant(s)

MAO ET AL.

Examiner

David L. Ometz

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 23 June 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-14 and 17-19 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-14, 17-19 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

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1. Applicant's claim for domestic priority under 35 U.S.C. 119(e) is acknowledged.
2. The drawing corrections were received on 6/23/03. These drawing corrections are approved by the examiner.
3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-14, 17-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dill et al (US Pat 6023395) in view of Gill '363. Dill et al shows a magnetic sensor in figure 4A (used in a hard disk drive (fig. 1) for a computer) that is a tunneling magnetoresistive stack wherein the stack includes: a free layer 132; a barrier layer 120 on the free layer 132; a pinned layer 118 on the barrier layer 120 wherein the pinned layer is a synthetic antiferromagnet (see col. 9, lines 65 *et seq.*); a bias layer 150 on the free layer 132 opposite the barrier layer 120 wherein the bias layer is composed of an antiferromagnetic layer (NiMn) placed on a ferromagnetic layer and a second spacer layer, the ferromagnetic layer and second spacer layer being between the bias layer 150 and the free layer 132 (see col. 13, lines 8-45); pinning layer 116 for pinning the pinned layer 118. However, Dill et al does not show the free layer 132 being a SAF composed of two NiFe films separated by an Ru spacer layer. Gill '363 shows a tunneling magnetoresistive stack in figure 11 that has a free layer 202 made of a SAF consisting of first and second ferromagnetic layers 210/212 with antiparallel magnetizations 214/216 and different thicknesses (30 Angstroms and 60 Angstroms) wherein an Ru spacer 208 separates the two ferromagnetic layers. Therefore, it would have been obvious to one of ordinary skill in the art at the time the

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invention was made to replace the single free layer 132 of Dill et al with the SAF free layer taught by Gill '363 as doing this would optimize "in-phase scattering of conduction electrons and response to signal fields" as set forth in the abstract of Gill '363.

4. Applicant's arguments filed 6/23/03 and attached to paper number 8 have been fully considered but they are not persuasive. Applicant asserts on pages 7-9 that because the reference to Gill includes a SAF free layer in the context of a dual tunnel junction head, it would not have been obvious to include a SAF free layer in a single tunnel junction head. However, the examiner maintains that one of ordinary skill in the art of magnetoresistive heads would have found it obvious to replace a single free layer with a SAF layer in a single tunnel junction head as the same benefit obtained by Gill in the dual tunnel junction head would have been expected in the case of a single tunnel junction head. Specifically, the SAF free layer of Gill helps to optimize the scattering of electrons through the sensor as the sense current is conducted orthogonally through the tunnel junction head. One of ordinary skill in the art would have had a reasonable expectation of achieving the same improvement in response within a single tunnel junction head as well. Therefore, the combination of Dill and Gill is still deemed proper.

5. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37

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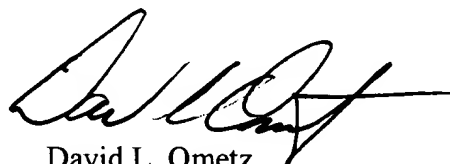
CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David L. Ometz whose telephone number is (703) 308-1296.

The examiner can normally be reached on M-F, 6:00-3:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, William Korzuch can be reached on (703) 305-6137. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9314 for regular communications and (703) 872-9314 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-4750.



David L. Ometz
Primary Examiner
Art Unit 2653

DLO
September 9, 2003